

What is claimed is:

1. An isolated, vertebrate nucleic acid molecule encoding dorsalin-1.
- 5 2. An isolated, vertebrate DNA molecule of claim 1.
- 10 3. An isolated, vertebrate cDNA molecule of claim 2.
4. An isolated, vertebrate genomic DNA molecule of claim 2.
- 15 5. An isolated, vertebrate RNA molecule of claim 1.
6. An isolated, human nucleic acid molecule of claim 1.
- 20 7. An isolated, mouse nucleic acid molecule of claim 1.
8. An isolated, chick nucleic acid molecule of claim 1.
- 25 9. A nucleic acid molecule comprising a nucleic acid molecule of at least 15 nucleotides capable of specifically hybridizing with a nucleic acid molecule of claim 1.
- 30 10. An isolated nucleic acid molecule of claim 2 operatively linked to a promoter of RNA transcription.

11. A vector which comprises the isolated nucleic acid molecule of claim 10.

5 12. A vector of claim 10, wherein the isolated nucleic acid molecule is linked to a plasmid.

13. The plasmid of claim 12 designated pKB502 (ATCC Accession No. 75321).

10 14. A host vector system for the production of a polypeptide having the biological activity of dorsalin-1 which comprises the vector of claim 11 in a suitable host.

15 15. A host vector system of claim 14, wherein the suitable host is a bacterial cell, insect cell, or animal cell.

20 16. A method of producing a polypeptide having the biological activity of dorsalin-1 which comprises growing the host vector system of claim 14 under suitable conditions permitting production of the polypeptide and recovering the polypeptide so produced.

25 17. A purified vertebrate dorsalin-1.

18. A purified human dorsalin-1 of claim 17.

30 19. A polypeptide encoded by the isolated vertebrate nucleic acid molecule of claim 1.

20. A method for stimulating neural crest cell differentiation in a culture comprising administering an amount of the purified

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dorsalin-1 of claim 17 effective to stimulate neural crest cell differentiation to the culture.

5           21. A method for stimulating neural crest cell differentiation in a subject comprising administering to the subject an amount of the purified dorsalin-1 of claim 17 effective to stimulate neural crest cell differentiation.

10           22. A method for regenerating nerve cells in a subject comprising administering to the subject an amount of the purified dorsalin-1 of claim 17 effective to regenerate nerve cells.

15           23. A method for promoting bone growth in a subject comprising administering to the subject an amount of the purified dorsalin-1 of claim 17 effective to promote bone growth.

20           24. A method for promoting wound healing in a subject comprising administering to the subject an amount of the purified dorsalin-1 of claim 17 effective to promote wound healing.

25           25. A method for treating neural tumor in a subject comprising administering to the subject an amount of the purified dorsalin-1 of claim 17 effective to inhibit the tumor cell growth.

30           26. A method of claim 25, wherein the neural tumor is neurofibroma.

35           27. A method of claim 25, wherein the neural tumor is Schwann cell tumor.

5           28. A pharmaceutical composition for stimulating neural crest cell differentiation comprising an amount of the purified dorsalin-1 of claim 17 effective to stimulate neural crest cell differentiation and a pharmaceutically acceptable carrier.

10           29. A pharmaceutical composition for regenerating nerve cells in a subject comprising an amount of the purified dorsalin-1 of claim 17 effective to regenerate nerve cells and a pharmaceutically acceptable carrier.

15           30. A pharmaceutical composition for promoting bone growth in a subject comprising an amount of the purified dorsalin-1 of claim 17 effective to promote bone growth and a pharmaceutically acceptable carrier.

20           31. A pharmaceutical composition for promoting wound healing in a subject comprising an amount of the purified dorsalin-1 of claim 17 effective to promote wound healing and a pharmaceutically acceptable carrier.

25           32. A pharmaceutical composition for treating neural tumor in a subject comprising an amount of the purified dorsalin-1 of claim 17 effective to inhibit neural tumor cell growth and a pharmaceutically acceptable carrier.

30           33. A pharmaceutical composition of claim 32, wherein the neural tumor is neurofibroma.

35           34. A pharmaceutical composition of claim 33,

wherein the neural tumor is Schwann cell tumor.

35. A method to produce antibody using the purified dorsalin-1 of claim 18.

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36. Antibody capable of binding to dorsalin-1.

37. A monoclonal antibody of claim 36.

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38. An antibody of claim 36 capable of inhibiting the biological activity of dorsalin-1.

39. A method for inhibiting dorsalin-1 activity in a subject comprising administering to the subject an amount of the antibody of claim 38 effective to inhibit the dorsalin-1 activity.

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40. A pharmaceutical composition for inhibiting dorsalin-1 activity comprising an amount of antibody of claim 38 effective to inhibit dorsalin-1 activity and a pharmaceutically acceptable carrier.

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